WHAT IS CLAIMED IS:

1. An optical waveguide device comprising an optical waveguide, and an optical input and output ports for inputting and outputting an optical signal to and from the optical waveguide, wherein the optical input port receives an optical signal inputted from the optical output port to the optical waveguide in accordance with a timing control signal inputted as an electrical signal to the optical input port.

2. An optical waveguide device according to claim 1, wherein the optical waveguide is an optical waveguide layer.

3. An optical waveguide device according to claim 1, wherein the optical input and output ports comprise an optical element for receiving or emitting a light in a direction nearly perpendicular to an optical waveguide direction in the optical waveguide, and optical path changing means provided in a desired position within the optical waveguide in correspondence to the optical element.

4. An optical waveguide device according to claim 3, wherein the optical path changing means is comprised of a optical reflector having a projection

shape, the optical element is a surface type element mounted to the optical waveguide in a state in which its central portion is aligned with the position of a vertex of the projection portion of the optical reflector, and each of the optical elements transmits and receives a signal to and from the whole area within the optical waveguide.

5. An optical waveguide device according to claim 3, wherein the optical path changing means is an optical reflector having a projection shape, and wherein the optical element is a surface type element mounted to the optical waveguide in a state in which its central portion is aligned with a position of the vertex of the projection portion of the optical reflector, and the optical element transmits and receives a signal to and from only a partial area within the optical waveguide.

6. An optical waveguide device according to claim 2, wherein the optical waveguide layer is formed by laminating a plurality of layers.

7. An optical waveguide device according claim 1, wherein an optical signal originated from the side of the optical output port is constituted by a packet signal train formed of a finite pulse train, and

wherein the timing control signal is individually sent as an instruction signal used to select adoption or rejection of the packet signal to the side of the optical input port to carry out time division packet switching to thereby switch an optical connection between the optical input and output ports.

8. An optical and electrical elements combined device, comprising electrical circuits, electrical chips for operating the electrical circuits, and the optical waveguide device according to claim 1, wherein a signal connection between the electrical chips is carried out using both an optical connection using the optical signal, and an electrical connection using at least the timing control signal used to control transmission and reception of the optical signal.

9. An optical and electrical elements combined device according to claim 8, wherein the optical input and output ports and the electrical chips are electrically connected to each other.

10. An optical and electrical elements combined device according to claim 8, wherein a part of or all of the electrical connection between the electrical chips is carried out using an electrical wiring

formed on a surface of the optical waveguide, or an electrical wiring formed on an electrical circuit substrate including the electrical circuits.

11. An optical and electrical elements combined device according to claim 8, wherein a plurality of optical waveguide layers constituting the optical waveguide are provided with optical input and output ports from the same electrical chip.

12. An optical and electrical elements combined device according to claim 8, wherein a plurality of connection terminals for surface mounting to other electrical circuit substrates are arranged on a surface of an electrical circuit substrate including the electrical circuits, and wherein the device takes a form of a chip size package.

13. A method of driving the optical and electrical elements combined device according to claim 8, comprising the steps of:

forming the optical signal transmitted from the side of the optical output port from a packet signal train formed of a finite pulse train;

individually transmitting the timing control signal as an instruction signal used to select adoption or rejection of a packet signal to the side

of the optical input port to carry out time division packet switching to thereby switch an optical connection between the optical input and output ports;

transmitting an electrical signal used to select adoption or rejection of the packet signal with a clock frequency depending on a repetitive period of a packet train from the electrical chip for transmission; and

receiving an electrical signal pulse used to select adoption or rejection of the packet signal at a timing earlier than a packet train selected in the electrical chip for reception to start capturing the packet signal at a timing of fall of the electrical signal pulse.

14. A method of driving the optical and electrical elements combined device according to claim 8, comprising the steps of:

forming an optical signal transmitted from the side of the optical output port from a packet signal train formed of a finite pulse train;

individually transmitting the timing control signal as an instruction signal used to select adoption or rejection of the packet signal to the side of the optical input port to carry out time division packet switching to thereby switch an

optical connection between the optical input and output ports;

storing control patterns for the packet switching are stored in a memory provided inside or outside the optical and electrical elements combined device: and

successively reading out the control patterns from the memory to control an operation of the optical and electrical elements combined device.

15. A method of driving the optical and electrical elements combined device according to claim 13, wherein the electrical chip for transmission and the electrical chip for reception are successively changed in a time division manner if necessary.

16. A method of driving the optical and electrical elements combined device according to claim 13 or 14, wherein when optical signals are transmitted at the same time within the same optical waveguide from a plurality of electrical chips, light intensities of the optical signals from the plurality of electrical chips are made different from one another.

17. A method of driving the optical and

electrical elements combined device according to claim 13 or 14, wherein the control patterns for the packet switching are rewritable by being downloaded as an intellectual property from the outside of the optical and electrical elements combined device, and the operation of the optical and electrical elements combined device is switched concurrently with the download.

18. An electronic equipment embedded the optical and electrical elements combined device as claimed in any one of claims 9 to 12 which makes it possible that a high-speed optical connection between electrical chips can be freely reconfigured, the equipment being so constructed that connections among a plurality of embedded systems can be switched at a high speed with one equipment.